

Notice of Allowability

Application No.

10/784,368

Examiner

Tony Lu

Applicant(s)

KONG ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/13/2006.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


Georgia Epps
Supervisory Patent Examiner
Technology Center 2800

DETAILED ACTION

This is in response to the amendment filed on 3/13/2006.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Kevin Grzelak on 3/22/2006.

The application has been amended as follows:

1. (currently amended) An object surface characterization system with adaptive lighting control, the system comprising:

a light projector for selectively providing a plurality of light beams arranged in a beam matrix of rows and columns, wherein the light beams impinge on a surface of a target and are reflected from the surface of the target;

a light source for selectively illuminating the surface of the target;

a camera for capturing a first image frame and a second image frame, wherein the first image frame includes contributions provided by the light source and the plurality of light beams of the beam matrix after reflection from the surface of the target, and wherein a second image frame includes contributions provided by the light source after reflection from the surface of the target;

a processor coupled to the light projector, the light source and the camera; and

a memory subsystem coupled to the processor, ~~the memory subsystem storing code that when executed by the processor instructs the processor wherein the~~ processor is configured to examine at least a portion of the first and second image frames to provide an indication of the intensities of the plurality of light beams and the

light source and control a camera integration time of the camera and a pulse width of the light source based upon the intensities of the plurality of light beams and the light source to achieve a desired target illumination.

7. (currently amended) The system of claim 1, ~~the memory subsystem storing additional code that when executed by the processor instructs the processor~~ wherein the processor is configured to perform the additional steps of:

- determining an intensity differential between the first and second image frames;
- estimating the light source intensity based upon the intensity of the second image frame; and
- estimating the light projector intensity based upon the intensity differential between the first and second image frames.

15. (currently amended) An object surface characterization system with adaptive lighting control, the system comprising:

- a light projector for selectively providing a plurality of light beams arranged in a beam matrix of rows and columns, wherein the light beams impinge on a surface of a target and are reflected from the surface of the target;
- a light source for selectively illuminating the surface of the target;
- a camera for capturing a first image frame and a second image frame, wherein the first image frame includes contributions provided by the light source and the plurality of light beams of the beam matrix after reflection from the surface of the target, and wherein the second image frame includes contributions provided by the light source after reflection from the surface of the target;
- a processor coupled to the light projector, the light source and the camera; and
- a memory subsystem coupled to the processor, ~~the memory subsystem storing code that when executed by the processor instructs the processor~~ wherein the processor is configured to examine at least a portion of the first and second image frames to provide an indication of the intensities of the plurality of light beams and the light source and control a camera integration time of the camera and a pulse width of

the light source based upon the intensities of the plurality of light beams and the light source to achieve a desired target illumination, wherein the light source includes at least one light emitting diode (LED) and the light projector includes a laser and a diffraction grating.

20. (currently amended) The system of claim 15, ~~the memory subsystem storing additional code that when executed by the processor instructs the processor~~ wherein the processor is configured to perform the additional steps of:

- determining an intensity differential between the first and second image frames;
- estimating the light source intensity based upon the intensity of the second image frame; and
- estimating the light projector intensity based upon the intensity differential between the first and second image frames.

Allowable Subject Matter

Claims 1-20 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art fails to disclose a system and its method for providing an object surface characterization system with adaptive lighting control, among other features, comprising: a camera to capture a first image frame and a second image frame, wherein the first image frame includes contributions provided by a light source, and a plurality of light beams of a beam matrix provided by a projector after reflection from a surface of a target, and wherein the second image frame includes contributions provided by the light source after reflection from surface of the target; and a processor, coupled to the light projector, the light source and the camera, is configured to examine

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at least a portion of the first and second image frames to provide an indication of the intensities of the plurality of light beams and the light source and control a camera integration time of the camera and a pulse width of the light source based upon the intensities of the plurality of light beams and the light source to achieve a desired target illumination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

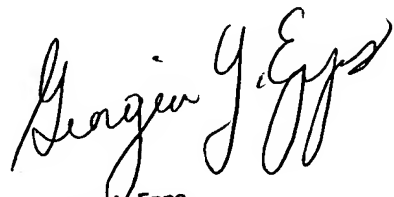
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Lu whose telephone number is 5712728448. The examiner can normally be reached on M-F 9:00am- 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 5712722328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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